THE ADAPTATION TO A HOSTILE ENVIRONMENT BY CHANGING OVIPOSITING CUES BY FEMALES OF THE SILVER-SPOTTED SKIPPER (*HESPERIA COMMA* LINN. 1758)

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I HAVE been studying the fortunes of several different sites on the North Downs properties of the National Trust, all of which usually contain good populations of *H. Comma*. One of the compartments which comes under close scrutiny is figured in E.B. Ford's *New Naturalist* Series No. 1 — Butterflies (first published 1945), plate XVIII facing page 135. In recent years I have noticed a marked diminution of suitable larval foodplant — the Sheeps-fescue grass (*Festuca ovina*). Although the actual quantity of the foodplant has little changed, its suitability has diminished due to severe grazing pressures by the ever-increasing rabbit population. The abundant *Festuca* appears to be the most favoured pabulum of the rabbit in preference to the *Brachypodium* and *Bromus* which also tend to dominate the chalk escarpments, and it is closely grazed to a bowling green like appearance in many of the more open areas.

The eggs of *H. comma* are very easy to find during the latter part of August, as they are rather large and conspicuous on the hair-like blades of *Festuca*. Those tussocks that are relatively isolated and with a percentage of bare ground in close proximity are the most frequently used ovipositing sites. Trying to locate eggs in late winter (February early March, before they hatch) is a different proposition.They are decidedly more difficult to locate and *H. comma* apparently suffers heavy mortality in the overwintering egg stage. In August 1988 thirty eggs were marked out *in situ* on the North Downs for re-locating the following spring. Twenty-one of these eggs disappeared during the winter months. I have come to the inevitable conclusion that most of these egg losses are incurred by grazing rabbits.

The extent of grazing varies from site to site and in different sections of an individual compartment, with areas of a more open nature perhaps being more susceptible to grazing pressure. My observations lead me to believe that the rabbit feels more secure when grazing in these open sites, having an all round vision of any possible predator attack and thus being able to instigate a quick and effective escape to nearby warrens. In areas where there is variable scrub growth and therefore restricted vision, grazing seems to be less intensive and a percentage of *Festuca* remains suitable for ovipositing *H. comma*. With this background, the future for *H. comma* on the North Downs and elsewhere must seemingly be threatened, despite its obvious survival with the rabbit populations of pre-myxomatosis times — I have certainly observed a marked decline in the number of suitable ovipositing sites for females over the past five years. Regular August

inspections of the *Festuca* have been made and several formerly good sites are now devoid of eggs, with merely the remnants of once succulent *Festuca* tussocks remaining as evidence of years past.

During August 1989 whilst working one of the most affected compartments, I noticed a female *H. comma,* after its typical low, short, buzzing ovipositing flight settle on an isolated tussock of Wood False-brome grass (*Brachypodium sylvaticum*) and deposit a single egg low down in its base. There were very few other possible ovipositing sites in the compartment, butanother egg was located a short distance away on *Festuca,* which had little chance of survival as the tussock was already grazed almost to soil level. 1990 saw a decided drop in adult numbers in this heavily grazed compartment, but on the other sites where the pressure was not so intense, numbers were well up to average. Most adult sightings in this depleted compartment were confined to small areas where there was a supply of nectar plants. These mostly consisted of rather small growths of Marjoram (*Origanum vulgare*) and Vipers Bugloss (*Echium vulgare*). Fortunately *H. comma* does seem to be a mobile species and stands of tall scrub do not seem to act as a barrier. I have observed on several occasions *H. comma* fly up and over tall scrub and they are often encountered some distance from their breeding areas, usually at nectar sources, although a temporary colonisation of a site distant from a major breeding site has been noted. This colony became extinct through a complete *lack* of grazing and was formerly winter grazed by two or three horses before being colonised by *H. comma.*

Several of those nectaring in the *Festuca* depleted compartment were seen to be females and it was not too long before I once again observed another female showing great interest in the small drought affected tussocks of *Brachypodium sylvaticum.* The previous fine summer and mild winter had provided the ideal conditions for further increases in the rabbit population and together with the 1990 summer drought had exacerbated the plight of *Festuca* and this was the response of *H. comma* to such a hostile environment. It became commonplace to see the females ovipositing on *Brachypodium* and eggs could even be located on this grass by searching the distinct isolated small tussocks. On one site in the Buckland Hills, a disused quarry, I also observed a female ovipositing and located eggs on Tor grass (*Brachypodium pinnatum*). In the North Downs compartment figured in Ford's book only at the top of the slope, where there was hawthorn and birch scrub, could eggs be located and the females seen ovipositing on the normal *Festuca* sites. The lawn-like main slope is dotted with now suitable tussocks of *Brachypodium* but there are very few nectar plants available to adults.

This unusual event in the ecology of *H. comma* appears to be another example of a positive response to environmental changes within a specialised habitat. A similar comparable event must have been experienced by the White-letter Hairstreak (*Strymonidia w-album* Knoch, 1782) in the

early 1970s at the onset of the severe outbreak of Dutch Elm disease. However, I believe that rather than actually changing from Elm (*Ulmus* sp.) as its larval foodplant, it successfully took advantage of different growth forms of the elm, using the young suckering growths rather than the mature trees of pre-Dutch Elm days.

It is therefore to be hoped that *H. comma* can overcome this pending crisis in a similar innovative manner, and always prosper on the North Downs, regardless of the fortunes of the rabbit. My studies will continue over the winter 1990-91 to re-locate eggs in the spring in order to get some indication of their overwintering success or otherwise.; It will also be important to confirm that the resulting larvae actually accept the *Brachypodium* as a larval pabulum. Wild larvae are difficult to find on *Festuca* growth but I am hoping that the silken structures they abide in will be more obvious in the *Brachypodium*. Damage to foodplant by larval eating should certainly be more distinct on the wider blades of this grass.

Postscript: Unfortunately the follow-up work on the *Brachypodium sylvaticum* was ruined by the ravages of rabbits who ate the small tussocks to the ground, also breaking off the markers in the process. Some ecologists believe that neither *Brachypodium sylvaticum* nor *B. pinnatum* are used by rabbits. My observations on both these species, at least in their spring flush of fresh growth, tell otherwise. K.J.W.

***Amphipoea lucens* Freyer, the Large Ear, and *A. fucosa* Freyer, the Saltern Ear (Lep.: Noctuidae) in Hertfordshire.**

From a total of 246 male individuals of the genus *Amphipoea* caught in the network of 26 Rothamsted Insect Survey (R.I.S.) light traps operating in Harpenden in 1990, 245 were found by examination of genitalia to be *A. oculea* L. One individual, caught on 24th August, is *A. lucens*. The trap which caught this specimen is situated in the middle of a field in intensive arable farmland. No *A. oculea* were caught at this site, or at two others nearby in a similar habitat.

A. lucens is usually absent from England south of a line from the Severn estuary to The Wash, although this species is reported in Heath, J. and Emmet, A.M. *Moths and butterflies of Great Britain and Ireland,* **10**, 1983 as occurring in Devon and Somerset. It also occurs in at least two wetland habitats in Cornwall. It may well be present but overlooked in suitable habitats in southern England owing to the difficulty of definite identification without examination of the genitalia. It is possible that routine examination of the genitalia, and less reliance on superficial characters, will reveal regular movements of *Amphipoea* species from their known distributional ranges.